Clostridium septicum bacteremia associated with aortic graft infection

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After emergency repair of a ruptured abdominal aortic aneurysm associated with an aortocaval fistula, *Clostridium septicum* sepsis prompted evaluation for colon cancer. Adenocarcinoma of the right colon ultimately required hemicolectomy, after which the patient had development of recurrent *C. septicum* bacteremia. Computed tomography scanning demonstrated a large fluid collection surrounding the aortic graft, and percutaneous drainage documented recurrent *C. septicum*. Initial axillobifemoral bypass was followed by removal of the patient's aortic graft and retroperitoneal drainage. After 3 years the patient is without evidence of recurrent infection or tumor. This case report consists of a known instance of *C. septicum* infection of an aortic graft. (J VASC SURG 1995;22:493-5.)

The association between infection and aneurysmal disease was noted by Pare in the mid-sixteenth century.[1] In recent years, there has been an increase in the association between aneurysmal disease and infection perhaps in association with the increasing use of immunosuppression.[2,3]

Clostridium septicum, an anaerobic bacterium, is associated with an increased incidence of occult gastrointestinal (colon) and hematologic malignancy.[4-11] In patients with occult malignancy, *C. septicum* occurred in older patients (64 vs 43 years, $p = 0.05$) and diabetic patients (68% vs 30%, $p = 0.005$) more frequently.[4] With these predisposing factors (increased age and incidence of diabetes), it is not surprising that there have been four reported cases of mycotic aortic aneurysms caused by *C. septicum*.[12-15] In this report, we describe the first case of *C. septicum* infecting an aortic tube graft necessitating graft removal.

CASE REPORT

A 67-year-old black man with a history of well-controlled hypertension and non-insulin-dependent diabetes mellitus was admitted to the emergency room at Brigham and Women's Hospital with bilateral groin pain, nausea, and vomiting. During initial examination, the patient had cardiac arrest. After resuscitation he was transported to the operating room on an emergency basis where the presumed diagnosis of ruptured abdominal aortic aneurysm was confirmed. An associated aortocaval fistula discovered during operation required repair of a caval defect in addition to a repair of his aneurysm. A Dacron aortic tube graft was implanted with use of the inclusion technique, and the large 2 × 3.5 cm defect in the vena cava was repaired with a saphenous vein patch graft.

On the third postoperative day, the patient had development of persistent guaiac-positive diarrhea and subsequently had pyrexia. The patient began receiving intravenous penicillin, with subsequent blood cultures demonstrating *C. septicum*. Because of the association of this organism with colon cancer, colonoscopy was carried out revealing a friable lesion in the proximal right colon.[4-6] Biopsies confirmed adenocarcinoma, and right hemicolectomy was carried out 2 weeks after repair of his ruptured aneurysm.

Four days after colectomy, the patient had development of recurrent pyrexia and increased right lower extremity swelling. Computed tomography scanning demonstrated a right psoas and right retroperitoneal collection in proximity to the aortic graft (Fig. 1). Percutaneous drainage yielded purulent material that on subsequent culture yielded *C. septicum*, despite the fact that the patient continued to receive high doses of intravenous penicillin. Angiography confirmed the integrity of the aortic repair, and the patient underwent a right axillobifemoral graft with ligation of the right external iliac artery (ligated because of ectatic nature and potential involvement with right psoas

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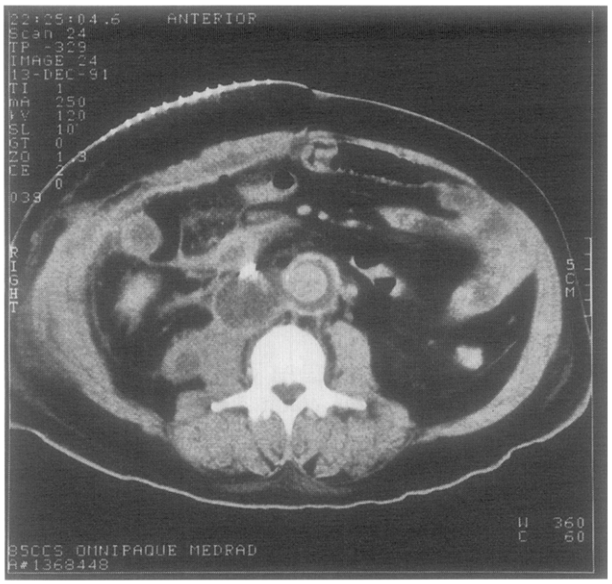

Fig. 1. Computed tomography scan of aortic tube graft with surrounding right periaortic and right psoas fluid collections.

collection) in anticipation of excision of his aortic tube graft. Three days later, he underwent removal of his infected infrarenal aortic prosthesis. During the operation, the periaortic retroperitoneal tissue was notably inflamed and hemorrhagic adjacent to the posterior wall of the aortic repair. During excision of this tissue, frankly purulent material was encountered surrounding the entire graft, which again proved positive for *C. septicum*. After control of the suprarenal aorta, the entire infrarenal aortic graft segment was excised to the level of the common iliac bifurcation, and the proximal aortic stump and both common iliac arteries were oversewn. The retroperitoneum was drained with a closed-suction drain.

The remainder of the patient's early postoperative course was unremarkable. During progressive rehabilitation, however, 2 months after his initial presentation, he suddenly had development of bilateral lower extremity claudication with occlusion of his axillofemoral reconstruction. Uneventful thrombectomy was carried out without identification of a specific cause of thrombosis, and subsequent angiography demonstrated a patent reconstruction with no significant pressure gradient across the proximal anastomosis. After 3 years the patient remains free of both infection and recurrent carcinoma of the colon.

DISCUSSION

Initially postulated as a component of normal gut flora, *C. septicum* has subsequently been shown to be not only pathogenic, but also a marker for malignancy.[8-11] Approximately 80% to 85% of patients infected with *C. septicum* demonstrate associated neoplasia, usually either a colon or hematologic malignancy.[4-7,16-18] Nearly one third of these malignancies are occult at the time of *C. septicum* bacteremia, and the cecum is the single area of colon with the highest incidence of occult carcinoma.

C. septicum infection has also been documented more frequently in patients with diabetes and severe atherosclerotic cardiovascular disease, both of which were present in our patient.[19] Approximately 19% of patients with *C. septicum* infections have diabetes, perhaps more prevalent in this population because bacteria may flourish in the setting of tissue rendered ischemic by accelerated atherosclerosis. *C. septicum* occurring in patients with diabetes has been cultured from both amputation stumps and peripheral ulcerations.[20] Patients who had development of *C. septicum* septicemia demonstrated an exceedingly high mortality rate (45% to 70%).[16-17,19-20]

The mainstay of therapy consists of intravenous penicillin and aggressive debridement of infected tissue. The value of early recognition with institution of proper therapy has been well documented by Koransky et al.,[16] who demonstrated that the mortality rate of patients with *C. septicum* septicemia approaches 100% if penicillin is not administered within the first 12 hours. Although our patient was treated early and appropriately with penicillin, and the infection prompted the discovery of an occult colon carcinoma, his aortic tube graft became secondarily infected, necessitating its removal.

This patient did not have a preexisting, clearly evident infected aortic aneurysm. Although occult infection cannot be ruled out because culture of the wall was not obtained, we hypothesize that *C. septicum* in the ulcerative colonic lesion translocated to the excluded aortic aneurysm wall and its contained prosthesis analogous to this pathogen's proclivity to infect necrotic muscle.[18,21] There have also been reports of *C. septicum* associated with mycotic aneurysms of the thoracic aorta,[12] the popliteal artery,[13] and the abdominal aorta.[14-15] To our knowledge, however, this represents the first reported case of an aortic prosthesis becoming infected with *C. septicum* and emphasizes the importance of early recognition with antibiotics and debridement.

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